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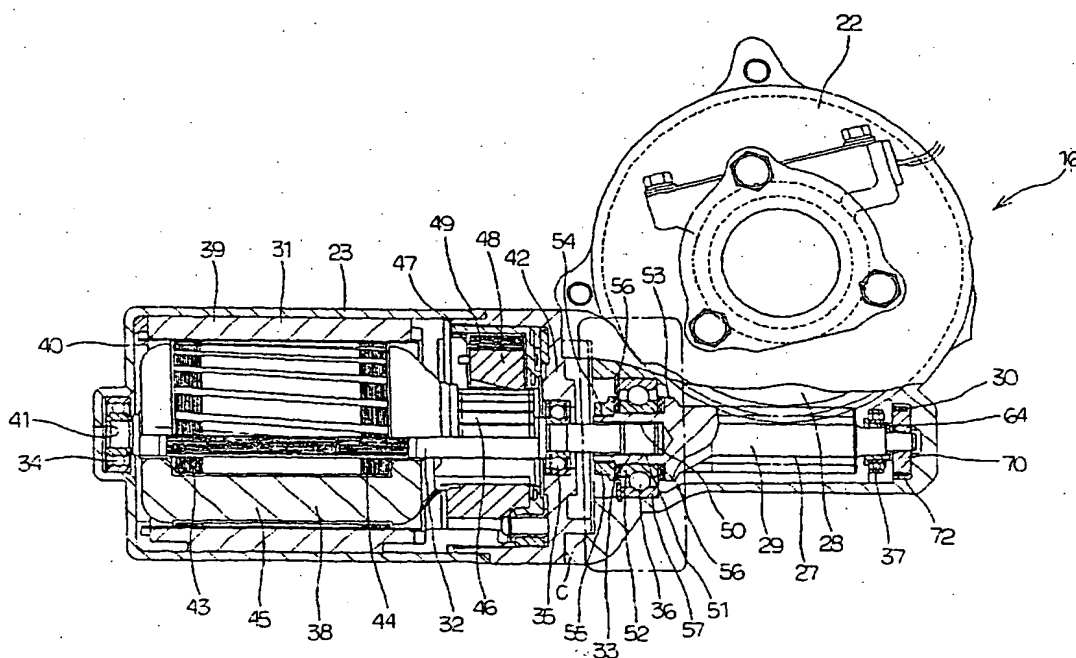
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For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: ELECTRIC-POWERED POWER STEERING APPARATUS



(57) Abstract: An assist apparatus for electric-powered power steering apparatus is provided to have a torque sensor, steering shaft, preload pad 70, a torsion coil spring 30, and an electric motor 31. With the preload pad 70 and torsion coil spring 30, an elastic force is applied to the worm shaft 29 in the direction toward the worm wheel 28, whereby noises due to colliding teeth are prevented from occurring in the meshing portion between the worm wheel 28 and worm shaft 29.

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-18

bearings in worm gear assemblies for electronic power steering systems with gearing mesh supporting means;

2. claims: 19-29

Tilting drive shaft inside e-motors;

3. claims: 30-39

Torsion coil spring for guided compensation of torque when positioned around a resin pre-loaded pad.

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/JP 03/07145

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B62D5/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B62D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 491 131 B1 (APPLEYARD MICHAEL) 10 December 2002 (2002-12-10)	19,20, 24,26, 27,30,38
Y	column 1, line 40 - line 59 column 2, line 1 - line 15 column 2, line 27 - line 65 column 3, line 12 - line 48 column 3, line 60 - column 4, line 9 column 4, line 43 - line 52 column 5, line 12 - line 43 column 6, line 1 - line 58 column 7, line 56 - line 67 column 8, line 1 - line 20	22,23
A	column 8, line 58 - column 9, line 18; claims 1-4,9,10,12-15; figures 1-6 ----- -/--	1,21,31

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
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- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

1 September 2004

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INTERNATIONAL SEARCH REPORT

International Application No.

T/JP 03/07145

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	BACKHAUS R: "DIE SERVOELECTRIC VON ZF" ATZ AUTOMOBILTECHNISCHE ZEITSCHRIFT, FRANCKH'SCHE VERLAGSHANDLUNG. STUTTGART, DE, vol. 100, no. 9, 1 September 1998 (1998-09-01), pages 636-638, XP000780494 ISSN: 0001-2785 page 1 - page 3	1
X	US 2002/121401 A1 (SHIMIZU YASUO ET AL) 5 September 2002 (2002-09-05)	30
A	paragraphs '0009! - '0012!, '0015!, '0016!, '0026!, '0039! - '0047!, '0090! - '0097!; claim 1; figures 1,5,6	19,20, 22,31
X	US 2002/017420 A1 (OTSUKA TATSUO ET AL) 14 February 2002 (2002-02-14)	30
Y	paragraphs '0003! - '0005!, '0008!, '0009!, '0016!, '0070! - '0077!	22,23
A	claims; figures 6,7,9	1,19,31, 35-38
A	PATENT ABSTRACTS OF JAPAN vol. 2003, no. 01, 14 January 2003 (2003-01-14) & JP 2002 266987 A (TOYODA MACH WORKS LTD), 18 September 2002 (2002-09-18) abstract	30-39

INTERNATIONAL SEARCH REPORT

International Application No

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US 6491131	B1	10-12-2002	BR 9911314 A 13-03-2001
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		DE 69913345 T2 27-05-2004	
		EP 1344710 A2 17-09-2003	
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INTERNATIONAL SEARCH REPORT

national application No.
PCT/JP 03/07145

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.